



# *Confined Space Program*

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## **Confined Space Operations**

Occasionally in our work, we may encounter confined spaces. Confined space work requires special safety precautions to ensure that employees are not overcome by dangerous air contaminants or oxygen deficiency. In some cases, there may be fire or explosion hazards in confined spaces that do not exist in open areas. This written program describes our procedures for preventing employee exposure to the hazards of a permitted confined space prior to entry and for safe entry operations in a confined spaces.

We will evaluate the workplace to determine if any spaces are permit-required confined spaces. In some cases, extra precautions may be necessary. We provide and train our employees with regards to all personal protective equipment and other equipment (i.e., testing, monitoring, ventilating, ladders, etc. at no cost to our employees) necessary for safe entry and work in confined spaces. All our employees must adhere to the following rules and work through the Self-Inspection Checklist. As always, if you are unsure, ask for assistance from your supervisor or our safety manager. If necessary, we will review our program and cancelled permits annually if measures taken might not protect our employees or deficiencies were found and revise our program/procedures accordingly. All employees may review our entry operations, permits, testing records at any time.

If the confined space area requires it necessary to providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards this will be done on a per job basis as an additional site-specific plan. This written program will be available for inspection by our employees and their authorized representatives.

## **Host/Controlling Employer**

We will not work in confined spaces with multiple employers, we will not be the host employer, we will not be the controlling contractor or arrange other contractors to perform work for us in a confined space.

If required before entry operations begin, we will obtain/request from the host/controlling employer the following information:

- The location of each known permitted space
- The hazards or potential hazards in each space or the reason it is a permit space
- Any precautions that the host employer or any previous controlling contractor or entry employer implemented for the protection of employees in the permit space
- Obtain the host employer's information about the permit space hazards and previous entry operations
- Provide the following information, if applicable, to any entity at the worksite whose activities could foreseeably result in a hazard in the permit space
- The information received from the host employer
- Any additional information the controlling contractor has about the item in this section
- The precautions that the host employer, controlling contractor, or other entry employers implemented for the protection of employees in the permit spaces

## **Confined Space**

A space defined by the concurrent existence of the following conditions:

- Existing ventilation is insufficient to remove dangerous air contamination, oxygen enrichment and/or oxygen deficiency that may exist or develop.
- Ready access or egress for the removal of a suddenly disabled employee is difficult due to the location

and/or size of the opening(s).

- Dangerous Air Contamination. An atmosphere presenting a threat of causing death, injury, acute illness, or disablement due to the presence of flammable and/or explosive, toxic, or otherwise injurious or incapacitating substances.
- Dangerous air contamination due to the flammability of a gas or vapor is defined as an atmosphere containing the gas or vapor at a concentration greater than 20 percent of its lower explosive (lower flammable) limit.
- Dangerous air contamination due to a combustible particulate is defined as a concentration greater than 20 percent of the minimum explosive concentration of the particulate.
- Dangerous air contamination due to the toxicity of a substance is defined as the atmospheric concentration immediately hazardous to life or health.
- If at any time there are changes and the competent person determines the non-permitted space to be permitted a re-evaluation and reclassification of the space will be made and permitted space procedures will be followed.

### **Permit-Required Confined Space**

We shall identify using the below characteristics and evaluate the hazards of a permitted space prior to employees entering. If it is identified as a permitted space, we will inform exposed employees and other employees performing work in the area, by posting danger signs or by any other equally effective means, of the existence, location of and the danger posed by the permit spaces.

- Have (or have the potential to have) a hazardous atmosphere.
- Have material that has a potential for engulfing anyone who enters the space.
- Spaces shaped inside in such a way that they could trap or asphyxiate someone entering.
- A space that contains any other recognized serious safety or health hazard.

EXAMPLES: Storage tanks, manholes, materials, storage bins, septic tanks, water towers, ventilation and exhaust ducts and pipeline castings.

### **A Non-Permitted Confined Space**

A confined space that does not have (or have a potential to have) any hazard capable of causing serious injury or death.

EXAMPLES: Mechanical or electrical closets, telephone booths and drop ceilings, pipe trenches.

***PERMIT REQUIRED CONFINED SPACES CAN BE DANGEROUS IF YOU ARE NOT PREPARED.  
NEVER ENTER A PERMIT SPACE WITHOUT AUTHORIZATION AND TRAINING.  
NEVER BYPASS ESTABLISHED PROCEDURES OR TAKE SHORT CUTS.***

When there are changes in the use or configuration of a 'non-permitted' confined space that might increase the hazards to entrants (or some indication that the initial evaluation of the space may not have been adequate), we will have our competent person reevaluate that space and, if necessary, reclassify it as a 'permit-required' confined space.

### **Employee Job Duties**

#### ***Authorized Entrant –***

- Know space hazards, including information of the mode of exposure, signs or symptoms, and

consequences of the exposure

- Use appropriate personal protective equipment properly
- Maintain communication with attendant to enable the monitoring of the entrant's status as well as to alert the entrant to evacuate
- Exit from permit space as soon as possible when ordered by an authorized person, when the entrant recognizes the warning signs or symptoms of exposure exist, when a prohibited condition exists, or when an automatic alarm is activated
- Alert the attendant when a prohibited condition exists, or when warning signs or symptoms of exposure exist

***Attendant –***

- Remain outside permit space during entry operations unless relieved by another authorized attendant
- You are not allowed to monitor or be an attendant for more than one confined space at a time
- Perform no-entry rescues
- Know existing and potential hazards
- Maintain communication with and keep an accurate account of those workers entering the permit-required space
- Order evacuation of the permit space when a prohibited condition exists, when a worker shows signs of physiological effects of hazardous exposure, when an emergency outside the confined space exists, and when the attendant cannot effectively and safely perform required duties
- Summon rescue and other services during an emergency
- Ensure that unauthorized persons stay away from permit spaces or exit immediately if they have entered the permit space
- Inform authorized entrants and entry supervisor of entry by unauthorized persons
- Do not perform other duties that interfere with the attendant's primary duties

***Entry Supervisor –***

- Know space hazards including information on the mode of exposure, signs or symptoms and consequences of exposure
- Verify emergency plans and specified entry conditions such as permits, tests, procedures and equipment before allowing entry
- Terminate entry and cancel permits when entry operations are completed or if a new condition exists;
- Take appropriate measures to remove unauthorized entrants
- Ensure that entry operations remain consistent with the entry permit and that acceptable entry conditions are maintained

**Key Safety Precautions**

- We must always take oxygen tests first, combustible tests second and finally toxic gases.
- This order is not in any way intended to minimize the seriousness all the testing.
- Testing should be at different times, pretest, and then a continuous testing during entry.
- Shut off, lock and tag out energy isolation devices such as electric disconnect or control valves to eliminate hazards posed by electrical, mechanical, hydraulic, and pneumatic systems.
- Double block should be used to prevent liquids from getting into a confined space. If a hazardous fluid gets into the line and leaks past the first block, it will be stopped by the second block.
- Blanking or blinding is a process of closing a pipe or line with a solid cover or cap and must completely

cover the pipe's bore and can withstand full line pressure without leaking.

- Whenever possible a confined space should be drained of its contents before entry. If the residue presents a hazard, the space should also be flushed and rinsed before entry.

## **Training and Education**

Training and education is to be provided to all workers required to work in permitted spaces specific to their duties and others. Additional training/re-training is required when (a) job duties change, (b) there is a change in the permit-space program or changes to the site entry procedures, and (c) when an employee's job performance shows deficiencies. Training is also required for rescue team members in CPR and First Aid. The training records will show trainers name, date, employees name and initials and be retained for at least 5 years or length of employment. This training will be at no cost to the employee and in a language they understand.

## **Entry without Permit/Attendant**

### ***Certification***

Confined spaces may be entered without the need for a written permit, or attendant, provided that the space can be maintained in a safe condition for entry by mechanical ventilation alone. All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. Any employee required, or permitted to pre-check, or enter an enclosed/confined space, shall have successfully completed, as a minimum, the training as required by the following sections of these procedures. A written copy of operating rescue procedures shall be at the work site for the duration of the job. The Confined Space Pre-Entry Checklist must be completed by the entry supervisor before entry into a confined space, and shall be kept at the jobsite for the duration of the job. If circumstances dictate an interruption in work, the permit space must be re-evaluated and a new checklist must be completed.

### ***Surveillance***

A tour of the area will be a pre-entry step and surveillance upon entering a confined space. The atmosphere within the space will be tested to determine whether dangerous air contamination and/or oxygen deficiency exists. The minimum parameters to be monitored are oxygen deficiency, combustible gases or vapors, and hydrogen sulfide concentration. A written record of the pre-entry test results shall be made and kept at the work site for the duration of the job. The entry supervisor will certify in writing, based upon the results of the pre-entry testing, that all hazards have been eliminated. Affected employees shall be able to review the testing results and be present during testing if they desire and request retesting and reevaluation of the space.

### ***Testing***

It is a firm rule that atmosphere within the space will be tested daily to determine whether dangerous air contamination and/or oxygen deficiency exist. The worker performing the testing shall have knowledge of the monitor being used. The minimum parameters to be monitored are oxygen deficiency, LFL, and hydrogen sulfide concentration. A written record of the pre-entry test results shall be made and kept at the work site for the duration of the job. The entry supervisor will certify in writing, based upon the results of the pre-entry testing, that all hazards have been eliminated. Affected employees shall be able to review the testing results and be present during testing if they desire and request retesting and reevaluation of the space.

### ***Entry Procedures***

If there are no non-atmospheric hazards present and if the pre-entry tests show there is no dangerous air

contamination, and/or oxygen deficiency within the space and there is no reason to believe that any is likely to develop, then work within may proceed. Continuous testing of the atmosphere in the immediate vicinity of the workers within the space shall be accomplished. The workers will immediately leave the permit space when any of the gas monitor alarm set-points are reached. Workers will not return to the area until it has been determined that it is safe to enter.

### ***Rescue***

Arrangements for rescue services are not required where there is no attendant. See the rescue portion below for instructions regarding rescue planning where an entry permit is required.

## **Entry Permit Required**

### ***Confined Space Entry Permit***

All spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. Any employee required, or permitted to pre-check, or enter a permit-required confined space, shall have successfully completed, as a minimum, the training as required by the following sections of these procedures. A written copy of operating and rescue procedures as required by these procedures shall be at the worksite for the duration of the job. The Confined Space Entry Permit must be completed before approval can be given to enter a permit-required confined space. This permit shall be kept at the site for the duration of the job. If circumstances cause an interruption in the work, or a change in the alarm conditions for which entry was approved, a new Permit must be completed. Exposed employees must be informed of the existence, location, and danger posed by the space(s), accomplished by posting danger signs or by another equally effective means. The following language would satisfy the requirements for such a sign:

***DANGER – PERMIT REQUIRED CONFINED SPACE –AUTHORIZED ENTRANTS ONLY***

### ***Surveillance***

The surrounding area shall be surveyed to avoid hazards. Upon entering an active storm drain, it is required to tour the area as a pre-entry step.

### ***Testing***

It is a firm rule that confined space atmosphere will be tested to determine whether dangerous air contamination and/or oxygen deficiency exists on a daily basis. The frequency of bump-testing or calibration of said monitor shall be maintained in accordance with said monitor's manual. Depending on the model of the meter, this may vary.

The following is required for testing:

- A copy of the manufacture's requirements can be made available upon request.
- A direct gas reading monitor shall be used.
- The worker performing the testing shall have successfully completed the gas detector training for the monitor he will use.
- All supervisors and foremen are trained and will use the air sampling testing equipment to determine if the atmosphere is safe for working in tunnels, shafts, or confined spaces.
- Before using the test equipment, the trained person will check to ensure the device is operating properly. Then take air samples to detect if there is sufficient oxygen for breathing and that there are no flammable or toxic gases that could injure a worker.
- When they have taken the readings, he will record them in the employee's log.

- The log will always be kept with the testing device during the life of the project.
- Information on the log will include the date of the test, time of test, type of testing done, and readings of the person doing the test.
- If toxic or flammable gases are detected, the supervisor will be informed at once by the superintendent. Also, the local fire and police/sheriff departments will be notified of a possible emergency.
- The work on the project will be stopped until appropriate corrective action can be taken.
- If the person testing for oxygen or gases feels that the readings showed on the testing devices are inaccurate, or the readings show marginal safe levels, they will contact his supervisor and will have another person perform the testing with another test meter.
- If respiratory equipment is needed for an operation, it will be supplied to when requested.
- Adequate prompt emergency communication will be immediately available to notify and summon required emergency response agencies if needed by telephone.
- When not in use, the testing equipment will be cleaned, cleared of sample air by purging with clean air, and will be stored in the protective casing.
- Affected employees shall be able to review the testing results and be present during testing if they desire and request retesting and reevaluation of the space.

### ***Space Ventilation***

Mechanical ventilation systems, where applicable, shall be set at 100% outside air. Use portable blowers to augment natural circulation if needed. After a suitable ventilating period, repeat the testing. Entry may not begin until testing has demonstrated that the hazardous atmosphere has been eliminated.

### ***Entry Procedures***

The following procedure shall be observed under any of the following conditions:

- Testing demonstrates the existence of dangerous or deficient conditions and additional ventilation cannot reduce concentrations to safe levels
- The atmosphere tests as safe, but unsafe conditions can reasonably be expected to develop
- An emergency exists and it is not feasible to wait for pre-entry procedures to take effect

All personnel must be trained. At least one worker (“attendant”) shall stand by the outside of the space ready to give assistance in case of emergency. The attendant shall have a self-contained breathing apparatus available for immediate use. There shall be at least one additional worker within sight or call of the attendant. Continuous communication shall be maintained between the worker within the confined space and attendant.

If, at any time, there is any questionable action or non-movement by the worker inside, a verbal check will be made. If there is no response, the worker will be moved immediately. Exception: If the worker is disabled due to falling or impact, he/she shall not be removed from the confined space unless there is immediate danger to his/her life. Local fire department rescue personnel shall be notified immediately. The attendant may only enter the confined space in case of an emergency (wearing the self-contained breathing apparatus) and only after being relieved by another worker. A harness with attached lifeline shall be used by all workers entering the space with the free end of the line secured outside the entry opening. For entry into a space with a vertical depth greater than 5 feet, a hand-operated mechanical retrieval device must be used. The attendant shall attempt to remove a disabled worker via his lifeline before entering the space.



When dangerous air contamination is attributable to flammable and/or explosive substances, lighting and electrical equipment shall be Class 1-Division 1 rated per National Electrical Code, and no ignition sources shall be introduced into the area.

Continuous gas monitoring shall be performed during all confined space operations. If alarm conditions change adversely, entry personnel shall exit the confined space and a new confined space permit issued.

### ***Rescue***

Call the fire department services for rescue using your cell phone. Where immediate hazards to injured personnel are present, workers at the site shall implement emergency procedures to fit the situation. At least one rescue team member is to be currently certified in First Aid and CPR. When wristlets or body harnesses are worn by authorized entrants, the other end of the retrieval line is to be attached to a mechanical device or fixed point outside the permit space. In addition, if an injured entrant is exposed to a substance for which an SDS is required, that SDS must be made available to the medical facility treating the exposed entrant. The attendant and supervisor will make sure that unauthorized persons do not attempt to rescue entrants.

### **Definitions**

**"ACCEPTABLE ENVIRONMENTAL CONDITIONS"** means confined space workplace conditions in which uncontrolled hazardous atmospheres are not present, and which include any additional environmental criteria the supervisor may require for employee entry into a permit required confined space.

**"ATTENDANT"** means an individual stationed outside the permit required confined space that is trained as required by this standard and who monitors the authorized entrants inside the permit required confined space. An attendant may monitor no more entrants nor permit spaces than the entry permit specifically authorizes.

**"AUTHORIZED ENTRANT"** means an employee who is authorized by the supervisor to enter a permit required confined space. Authorized entrants may rotate duties, serving as attendants if the permit program and entry permit so state. Any properly trained person with the authority to authorize entry by other persons may enter the permit space during the term of the permit provided the attendant is informed of the entry.

**"BLANKING" OR "BLINDING"** means the absolute closure of a pipe, line, or duct by fastening across its bore a solid plate or "cap" which completely covers the bore; which extends at least to the outer edge of the flange at which it is attached; and which is capable of withstanding the maximum upstream pressure.

**"DOUBLE BLOCK AND BLEED"** means the closure of a line, duct or pipe by locking and tagging a drain or vent which is open to the atmosphere in the line between two lock-closed valves.

**"EMERGENCY"** means any occurrence (including any failure or hazard control or monitoring equipment) or event(s) (internal or external) to the confined space which could endanger entrants.

**"ENGULFMENT"** means the surrounding and effective capture of a person by a liquid or finely divided solid substance.

**"ENTRY"** means the act by which a person intentionally passes through an opening into a permit required confined space, and includes ensuing work activities in that space. The entrant is considered to have entered as soon as any part of the entrant's face breaks the plane of an opening into the space.

**"ENTRY PERMIT"** means the written or printed document established by our company, the content of which is based on our hazard identification and evaluation for that confined space (or class or family confined spaces if a number of spaces may contain similar hazards), and is the instrument by which we authorize our employees to enter the permit required confined space but only if trained to do so. The entry permit: Defines the conditions under which the permit space may be entered; states the reason(s) for entering the space; states the anticipated hazards of the entry; for entries where the individual authorizing the entry

does not assume direct charge of the entry, lists the eligible attendants, entrants, and the individuals who may be charge of the entry; and establishes the length of time for which the permit may remain valid.

**"ENTRY PERMIT SYSTEM"** means our written procedures for preparing and issuing permits for entry and returning the permit space to service following termination of entry, and designates by name or titles the individuals who may authorize entry.

**"HAZARDOUS ATMOSPHERE"** means an atmosphere that exposes employees to a risk of death, incapacitation, injury, or acute illness from one or more of the following causes:

- A flammable gas, vapor, or mist in excess of 10 percent of its flammable limits (LFL);
- An airborne combustible dust at a concentration that obscures vision at a distance of five feet or less;
- An atmosphere oxygen concentration below 19.5 percent or above 23.5 percent.
- An atmospheric concentration of any substance for which a permissible exposure limit is published and could result in employee exposure in excess of its permissible limit(s). [When an air contaminant for which OSHA has not determined a permissible exposure limit may be present in the permit space atmosphere, OSHA recommends employers consult other sources of information, such as Safety Data Sheets (SDS's) which comply with the Hazard Communications Standards for guidance in establishing the acceptable environmental conditions for entry by their employees.
- Any atmospheric condition recognized as immediately dangerous to life and health.

**"HOT WORK PERMIT"** means our written authorization to perform operations which could provide a source of ignition, such as welding, cutting, riveting, heating or burning.

**"IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH)"** means any condition which poses an immediate threat to loss of life; may result in irreversible or immediate-severe health effects; may result in eye damage; irritation, or other conditions which could impair escape from the permit space. We will not work in any space where this is a condition.

**"IMMEDIATE-SEVERE HEALTH EFFECTS"** means any acute clinical sign(s) of serious, exposure-rated reaction manifested within 72 hours after exposure.

**"INERTING"** means rendering the atmosphere of a permit space non-flammable, non-explosive or otherwise chemically non-reactive by such means as displacing or diluting the original atmosphere with steam or gas that is non-reactive with respect to that space.

**"IN-PLANT RESCUE TEAM"** means a group of two or more employees designated and trained to perform rescues in permit spaces in their plant.

**"ISOLATION"** means the separation of a permit space from unwanted forms of energy which could be a serious hazard to permit space entrants. Isolation is usually accomplished by such means as blanking or blinding; removal, or misalignment of pipe sections, or spool pieces; double block and bleed; or lockout and/or tagout.

**"LOW-HAZARD PERMIT SPACE"** means a permit space where there is an extremely low likelihood that an IDLH or ENGULFMENT hazard could be present and where all serious hazards have been controlled.

**"NOT-PERMITTED CONDITIONS"** means any conditions, or set of conditions, whose hazard potential exceeds the limit stated in the entry permit.

**"OXYGEN DEFICIENT ATMOSPHERE"** means an atmosphere containing less than 19.5 percent oxygen by volume.

**"OXYGEN ENRICHED ATMOSPHERE"** means an atmosphere containing more than 23.5 percent oxygen by volume.

**"PERMIT REQUIRED CONFINED SPACE"** (permit space) means an enclosed space which:

- Is large enough and so configured that an employee can bodily enter and perform assigned work, and has limited or restricted means for entry or exit (some examples are tanks pits, vaults, vessels,

silos, storage bins, hoppers, and dike areas).

- Is not designed for continuous employee occupancy; and,
- Has one or more of the following characteristics:
- Contains, or has a known potential to contain, a hazardous atmosphere.
- Contains a material with the potential for engulfment of an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section: or,
- Contains any other recognized safety or health hazard.

**"PERMIT REQUIRED CONFINED SPACE PROGRAM"** means our program for preventing unauthorized employee entry, and for ensuring safe entry into and work within permit spaces by authorized employees.

**"RETRIEVAL LINE"** means a line or rope secured at one end to the worker by a full-body harness and with its other end secured to either a lifting (or other retrieval) device, or to an anchor point located outside the entry portal.

## **Confined Space Self-Inspection Checklist**

- All known lines to the confined space, containing inert, toxic flammable, or corrosive materials have been valved off, blanked or disconnected and separated before entry.
- The confined space has been checked for possible industrial waste which could contain toxic properties.
- Confined spaces have been thoroughly emptied of any corrosive or hazardous substances, such as acids or caustics prior to work being performed.
- There is an assigned standby employee outside of the confined space, when required, whose sole responsibility is to watch the work in progress.
- The standby employee has been appropriately informed of the plans/procedures in case of an emergency.
- The standby employee or other employees are prohibited from entering the confined space without lifelines and respiratory equipment if there is any question as to the cause of the emergency.
- Appropriate atmospheric tests have been performed to check for: oxygen deficiency, toxic substance and explosive concentrations in the confined space before entry.
- The atmosphere inside the confined space is continuously monitored during conduct of work.
- Natural or mechanical ventilation is provided, when necessary, prior to confined space entry.
- Approved respiratory equipment is required if the atmosphere inside the confined space cannot be made acceptable.
- If necessary, adequate illumination will be provided for work to be performed in the confined space.
- If it is required, all impellers, agitators and other moving equipment inside confined spaces has been locked out.
- A portable electrical equipment being used inside the confined spaces is either grounded or insulated or equipped with ground fault protection.
- Before gas welding or burning is started in a confined space, hoses have been checked for leaks, compressed gas bottles forbidden inside of the confined space, torches lighted only outside of the confined area and the confined area tested for an explosive atmosphere each time before a lighted torch is to be taken into the confined space.
- Employees will be using oxygen consuming equipment such as salamanders, torches, furnaces, etc., in the confined space, and sufficient air has been provided to assure combustion without reducing the oxygen concentration of the atmosphere below 19.5% or above 23.5% by volume.

**Flow Chart**

***Flow Chart-Permit Required Confined Space Decision***

